The NPU terminology – a uniting language for laboratory medicine in the Scandinavian countries

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CONCLUSIONS

The Nomenclature for Properties and Units (NPU) terminology is used to describe and code intended measurands in laboratory examinations. The use of correct NPU codes ensures accurate exchange of laboratory data across healthcare systems, enhancing the reliability of clinical information and contributing to improved patient safety.

When the same measurand is measured using multiple methods, the results should ideally be clinically comparable. This allows them to be presented together, using a common NPU code and a shared reference interval, in integrated health and social care documentation, such as an Electronic Patient Record (EPR).

External quality assessment (EQA) is a tool to determine whether results are clinically comparable or not. If incomparability between methods is discovered, additional NPU codes may need to be created. Therefore, close collaboration between NPU code management and EQA organizations is essential.

INTRODUCTION

In the interconnected healthcare landscape, accurate, accessible, and interpretable exchange of structured laboratory results across institutions is essential. The NPU terminology addresses this need by providing a standardized system for naming and coding laboratory examinations. This syntax system was introduced in the Scandinavian countries in the 1970s, and later jointly developed by IFCC and IUPAC to provide an unambiguous description of measurands. In 1995, codes were added to the fully specified names and made publicly available in a database. Since then, the system has expanded to include more than 16,000 active codes across clinical chemistry, microbiology, genetics, and pharmacology.

In Sweden, Equalis serves as both provider of EQA and National Release Centre (NRC) for the Swedish version of the NPU terminology. A national database is maintained, currently containing 9,429 NPU codes actively used by laboratories in Sweden[1].

AIM

To present an overview of outcomes and insights gained from many years of managing the NPU terminology in Sweden and providing EQA services.

METHODS

In the EQA reports, the correct NPU codes to use for clinical laboratories are presented. The laboratories are then encouraged to check that their patient results are reported with the correct NPU codes.

For each component in an EQA round, relative method bias is checked for the major method groups. The observed relative bias is then compared with the minimum performance specification for bias in the EFLM biological variation database (EFLM BV bias)[2]. If the observed relative bias is larger than the EFLM BV bias, it is not possible to use the same reference interval for the method groups. The patient results should then be reported on separate lines in the lab report, and the measurands should be distinguished with different NPU codes.

The NRC initiates creation of new international NPU codes when needed and has also mandate to create national SWE codes, as a complement to international NPU codes, to fulfil the requirements for handling laboratory results in the Swedish EPR. The decision to create national SWE codes, in addition to international NPU codes, is taken by Equalis' advisory groups.

RESULTS

In the EPR, laboratory results from one patient can be collected from different laboratories, e.g. from lab A, B, and C as in the tables below.

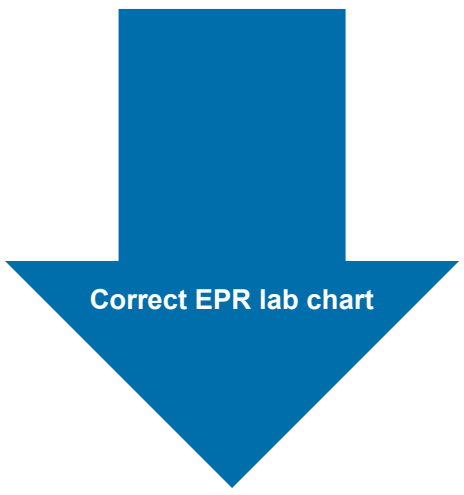
A common cause of error is that patient results are sent from the laboratories with incorrect codes[3]. The outcome is then that the patient results are incorrectly presented* in the EPR lab chart.

Another cause of error is that incomparable patient results** are displayed with a common NPU code, when they, in fact, should have distinct codes. The relative method bias presented in EQA reports is used to decide if results fulfil the requirements for clinical comparability and can be reported on the same line in the EPR lab chart, with the same NPU code.

Incorrect EPR lab chart

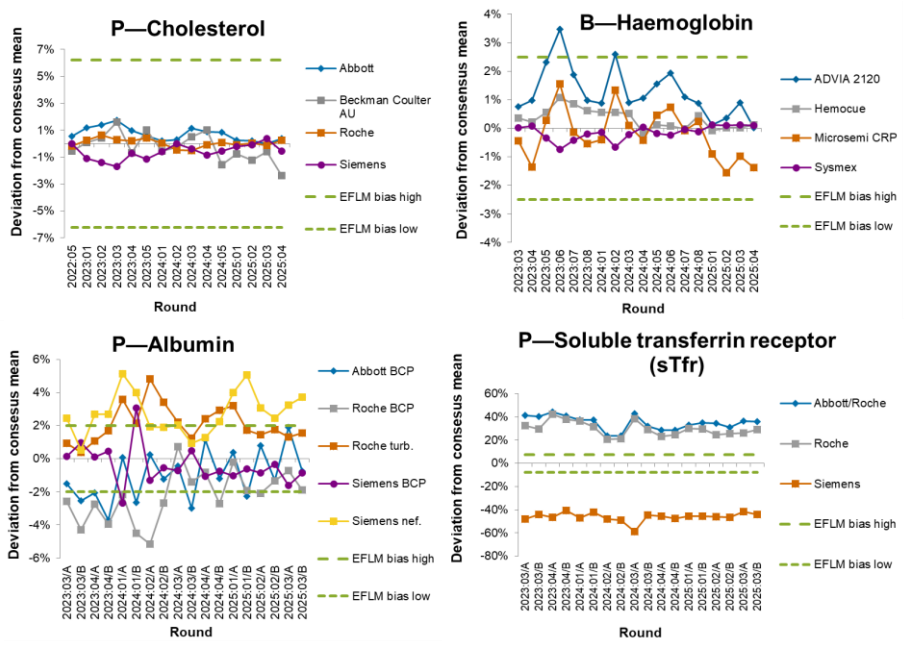
Test	2025-09-11 Lab **C**	2025-08-17 Lab **B**	2025-07-17 Lab **B**	2024-04-20 Lab **A**	2023-08-17 Lab **C**	2021-06-07 Lab **B**
B-Haemoglobin	125 g/L	100 mmol/L*	127 g/L	131 g/L	134 g/L	120 g/L
P-Albumin	34 g/L**	40 g/L	42 g/L	41 g/L	35 g/L**	43 g/L
P-Cholesterol	4.3 mmol/L	4.4 mmol/L	4.5 mmol/L	4.3 mmol/L	4.2 mmol/L	4.4 mmol/L
P-Soluble transferrin	2.9 mg/L	6.7 mg/L**	6.9 mg/L**	2.5 mg/L	2.7 mg/L	6.0 mg/L**

*Incorrectly presented patient result for B-Haemoglobin.
**Incomparable patient results for P-Albumin and P-Soluble transferrin.



Correct EPR lab chart
Accurate coding and proper data presentation lead to comparable results.

Code	Test	Lab **C**	Lab **B**	Lab **B**	Lab **A**	Lab **C**	Lab **B**
NPU28309	**B—Haemoglobin**	125 g/L		127 g/L	131 g/L	134 g/L	120 g/L
NPU19673	**P—Albumin**	34 g/L				35 g/L	
SWE05155	**P—Albumin (imm)**		40 g/L	42 g/L	41 g/L		43 g/L
NPU01566	**P—Cholesterol**	4.3 mmol/L	4.4 mmol/L	4.5 mmol/L	4.3 mmol/L	4.2 mmol/L	4.4 mmol/L
SWE05065	**P—Soluble transferrin, low cal**	2.9 mg/L			2.5 mg/L	2.7 mg/L	
SWE05066	**P—Soluble transferrin, high cal**		6.7 mg/L	6.9 mg/L			6.0 mg/L



The figures show relative method bias in EQA from consensus mean for the major method groups. The limits of the EFLM BV bias for minimal performance are indicated by green dashed lines.

For **cholesterol** and **haemoglobin**, the EQA bias is within the limits of the EFLM BV bias; thus, patient results can be presented together.

For **albumin** and **sTfr**, the EQA bias exceeds the limits of the EFLM BV bias; thus, patient results must be reported as separate method groups requiring distinct NPU or SWE codes.

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REFERENCES

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2. EFLM biological variation database: https://biologicalvariation.eu/
3. Bietenbeck A, et al. Supporting trend detection in the cumulative display of electronic laboratory reports from multiple laboratories while preserving measurement provenance. Clin Chem Lab Med 2025 Sep 25 (Epub ahead of print).